treated, gives a yellow light; from which he concludes that the different colors depend upon different crystalline states, the composition remaining the same.

The speaker had been fortunate enough to observe the rare phenomenon of the phosphorescence of snow, having seen a snow-covered Alpine mountain shining at night as though illuminated by moonlight. This beautiful appearance lasted for about half an hour only, and was confined to a single mountain. Here again the phosphorescence, although of quite a different kind from either of those mentioned above, was purely physical, depending upon the assumption of a certain crystalline condition of the snow.

In general, the phosphorescence of a substance may be said to depend upon an alteration in its molecular state of aggregation. In the case of "Hell-fire rock" it appears to be the result of a disturbance of its loosely aggregated crystalline particles, whether such disturbance be produced by percussion, friction, heat or decrepitation.

The New Jersey Coast after the storm of Jan. 8, 1884.—Professor LEIDY stated that, in company with Dr. Sharp and Mr. Ford, he had made a trip to Atlantic City, N. J., to observe the result of the recent storm on the marine animals of our coast. The shore at the highest line reached by the tides was for miles covered with incalculable numbers of the Beach-clam, *Mactra solidissima*. These in many places formed extensive patches actually closely paved with the clams. Besides those visible, it is probable as many or more were covered by the sand thrown up with the clams. Until this evidence of the storm, he had no suspicion that the mollusk was so exceedingly abundant on the coast, though he had been well aware that it was very common, and had repeatedly seen large quantities thrown on shore under similar circumstances. With the Mactra were other mollusks, and, though numerous enough, they appeared to be few compared with the former. These were *Fulgur carica* and *F. canaliculata*, *Natica heros* and *N. duplicata*, and *Nassa obsoleta*. Hermit crabs were also numerous, *Eupagurus pollicaris* in shells of Natica and Fulgur, and *E. longicarpus* in shells of Nassa. The former shells had attached abundance of *Crepidula unguiformis*, and occasionally on the outside a *C. fornicata*. Of other crabs, the Spider-crab, *Libinia canaliculata* and *Platyonichus ocellatus* were frequent. A few half-grown Horse-shoe crabs, *Limulus polyphemus*, were also observed. A few bunches of *Mytilus edulis* were occasionally met with.

It seemed remarkable that certain common mollusks were conspicuously absent, as the Oyster, *Ostrea virginiana*, the Clam, *Venus mercenaria*, the Squirt-clam, *Mya arenaria*, and the Horse mussel, *Modiola plicatula*. Scarcely any annelides were observed,

except masses of dead *Serpula* invested with *Eschara variabilis*. There were also no echinoderms, except one, the *Caudina arenata*, which occurred in some places in considerable numbers. This, it was believed, is the first time the animal has been observed on the coast of New Jersey. The specimens presented were collected by Mr. Ford. They usually range from three to four or five inches in length; but several were upwards of six inches, and over an inch at the thicker portion of the body.

It is an interesting question as to what becomes of the vast quantities of *Mactra* and other shells incessantly cast on shore. Storms annually oblige the ocean to contribute from its inexhaustible stores, multitudes of mollusks and other animals to the sandy beach. By exposure to the influence of the weather, the air, the sun, the rain, frosts and other violence, the calcareous shells are broken and decomposed, and in a comparatively few years entirely disappear. Carbonic acid, of the rain-water, must be a potent agent in their ultimate solution as it percolates through the sands. While the beach receives its constant supplies of shells, no trace of these is to be found in the sands immediately back of the shore; which sands in former times received the same incessant contributions. For similar reasons, no doubt, calcareous fossils are comparatively rare in sandstones, though in many cases their impressions are well preserved.

Flora of North America.—At the meeting of the Botanical Section of the Academy, held on January 14, Dr. Asa Gray spoke of the progress of the forthcoming portion of the Synoptical Flora of North America, and of the occasions which had led to the publication of the middle portions in advance of the earlier. It had seemed important now to secure the results of the many years of study which he had given to the large and difficult order of Compositæ, which will form the bulk of the forthcoming part. He spoke of the perplexities attendant upon the accurate definition of generic divisions in this order, and especially of properly discriminating the species of such genera as *Aster* and *Solidago*. He had no idea that he had really solved the difficulties of this kind, or that any one would entirely solve them; but he had done his best. He could himself name the species of *Solidago*, and he could name a good many Asters; but he doubted whether he had enabled other botanists to name them. Being asked whether his views respecting the limitation of species had not undergone some change, in the direction of admitting more species now than formerly, he admitted that this was probably the case. He still held to what might be termed the Linnæan conception of species, that they were to be taken in a broad sense and expected to comprise various forms, which might or might not be classified into varieties. But whereas, in his younger days, species were thought to be independent creations, and the real differences,

if we could find them, supposed to be absolute, we now look upon allied species as having descended from a common ancient stock, of which intermediate forms have died out, and therefore do not expect that allied forms, on the whole distinct and definable, should be completely unconnected by certain links or vestiges of links. Moreover, it used to be thought that hybrids were necessarily sterile, but it is now known that some hybrids are fertile, and that their offspring, fertilized by either parent, are generally fertile; that in this way intermediate forms between two species may originate; and it is clear that the two species ought not to be reduced to one on account of such intermediate forms. Dr. Gray referred to *Rosa*, *Rubus* and *Hieracium*, in the Old World, as genera in which no two botanists who had studied them could agree as to what were species; one school reducing them to very few, which they can define only by disregarding certain intermediate forms; the other multiplying them by hundreds, and characterizing them by distinctions which might serve for the specimens in hand, but which failed with every new collection. This necessitated either the formation of a still finer-drawn set of species, or the falling back to the broader Linnæan conception of a species. The latter alternative had been generally followed in this country, and Dr. Gray hoped that the coming American botanists would incline to this view in the treatment of our critical genera.

Relation of Medullary Rays to the Strength of Timber.—Dr. Rothrock called attention to some experiments made by Mr. Frank Day, in the laboratory of the University of Penna., on the relation of the medullary ray to the strength of timber. Mr. Day had found that it required just about twice as much force (say 1130 pounds) to pull apart a square inch of live oak, if the force ran parallel to these rays as if the force were applied at right-angles to them.

What is true of the live oak was also largely true of other timbers. The buttonwood (*Platanus occidentalis*) was remarkable for the development of its medullary rays, and also for the difficulty in splitting that wood at right-angles to them.

Mr. Day's experiments also proved that there existed great differences in the quality of the material of the woody fibre; for in timber where the relative proportion of wood and ducts could well be compared, and where the fibres were of equal size throughout, differences in strength were to be found.

Botanical Notes. Double Flowers in Gelsemium nitidum; Euonymus Japonicus; Development of Fruit of Opuntia; Helianthus tuberosus; Carya glabra.—Mr. Meehan exhibited two specimens of double flowers of *Gelsemium nitidum*, one found wild in Georgia, the other in Alabama. One was straw-colored, the other deep yellow. He remarked that many double flowers in